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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of: **NORMAN SZALONY et al.**Appln. No.: **10/077,215**Filed: **02/15/2002**For: **A SHAFT TO TRANSFER TORQUE IN
A VEHICLE**Attorney Docket No: **10541-1273**Examiner: **T.C. To**Art Unit: **3616**

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☒ BRIEF ON APPEAL☐☐

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Respectfully submitted,

Hugo A. Delevie

Hugo A. Delevie (Reg. No. 32,688)

September 28, 2004

Date

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In re Appln. of: NORMAN SZALONY et al.
Appln. No.: 10/077,215
Filed: 02/15/2002
For: A SHAFT TO TRANSFER TORQUE
IN A VEHICLE
Attorney Docket No: 10541-1273

Examiner: T.C. To
Art Unit: 3616

BRIEF ON APPEAL

This is a Brief under 37 C.F.R. §41.37 in support of the appeal of the final rejection of claims 3-6 and 9-15 set forth in the final Office action mailed March 23, 2004, as noticed in the Notice of Appeal filed by Appellants on July 28, 2004, and includes the following parts:

- I. Real Party in Interest, at page 2;
- II. Related Appeals and Interferences, at page 3;
- III. Status of Claims, at page 4;
- IV. Status of Amendments, at page 5;
- V. Summary of Claimed Subject Matter, beginning at page 6;
- VI. Grounds of Rejection to be Reviewed on Appeal, beginning at page 9;
- VII. Argument, beginning at page 10; and
- VIII. Claims Appendix, beginning at page 18.

Appellant notes that the Transmittal to which this paper is attached includes both a Certificate of Facsimile Transmission under 37 C.F.R §1.8; and a fee statement authorizing the Director to charge a briefing fee of \$320.00 under 37 C.F.R. § 1.17(c), along with any fee deficiency associated with the filing of this Brief, to Appellants' assignee's Deposit Account No. 06-1500.

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I. REAL PARTY IN INTEREST

The real party in interest is Visteon Global Technologies, Inc., as recorded in the Office on April 22, 2002, at Reel 012836, Frames 0796-97.

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II. RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences related to the present appeal.

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III. STATUS OF CLAIMS

Claims 1, 2, 7, and 8 have been cancelled.

Claims 3-6 and 9-15 are pending in this application and stand finally rejected.

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IV. STATUS OF AMENDMENTS

On July 28, 2004, and concurrently with the Notice of Appeal, Appellants filed a "Reply After Final Under 37 C.F.R. §1.116" wherein Appellants sought to amend dependent claim 9 to address an as-yet-unidentified lack of antecedent basis in claim 9's preamble, to thereby place the claim in a form suitable for appeal as to the outstanding art-based final rejection. While Appellants have not received notice confirming the entry of this after-final Reply for purpose of appeal as of the filing date of this Brief, Appellants respectfully request entry of said Reply and, further, have correlatively updated the Claims on Appeal as recited in the Appendix hereto (Section VIII) to reflect the amendment.

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V. SUMMARY OF CLAIMED SUBJECT MATTER**CLAIM 6**

The invention embodied in Appellants' first independent claim, claim 6, is summarized as follows:¹ a shaft 10,19 (¶¶8,10,11; Figs. 1,4) to transfer torque in a vehicle, comprising a first member 11 (¶¶8,11; Figs. 1-3) having internal splines 12 (¶¶8,11; Figs. 1-3) and a second member 13 (¶¶8,11; Fig. 1) having external splines 14 (¶¶8,11; Fig. 1) engagable with the internal splines to allow telescopic movement between the first member and the second member (¶¶8,13) and to transfer torque between the first member and the second member (¶¶8,9).

Claim 6 further recites the limitations that the external splines include an isotropic surface finish, and the external splines have a coating applied to the isotropic surface finish to reduce friction during telescopic movement (¶¶8,13). More specifically, the latter two limitations are clearly taught by Appellants in specification paragraph 13, at page 4, line 21, through page 5, line 3:

Further, in the preferred embodiment, the external splines 14 also have an isotropic surface finish, as described in US 5,503,481 entitled "Bearing Surfaces with Isotropic Finish", issued on 02 April 1996, and incorporated in its entirety by this reference. The tungsten disulfide coating over an isotropic surface finish significantly reduces the friction between the first member and the second member, while increasing the wear and durability of the shaft.

(Emphasis added.) As taught in the '481 patent (the disclosure of which is expressly incorporated by reference, as recited above), an "isotropic surface finish" is a surface finish characterized by "extremely shallow irregularities that are nondirectional" and "very low average asperity slopes and likewise a very low plasticity indexes" ('481 patent Abstract, at lines 3-6); see, also, '481 patent, col. 2, lines 28-38 (isotropic surface finish is achieved by virtue of a further finishing step, after the surface is initially machined by grinding to achieve the desired profiles).

¹ Parenthetical references to paragraph numbers correspond to paragraph numbers in the original application as filed.

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CLAIM 12

The invention embodied in Appellants' second independent claim, claim 12, is summarized as follows: a suspension system for a vehicle having a wheel 17 (see ¶9 and Fig. 4) and a power distribution device 18 (see ¶9 and Fig. 4), the suspension system including a biasing device 22 to support the vehicle on the wheel and to absorb road imperfections (see ¶10, wherein the "biasing device 22, which functions to support the vehicle on the wheel 17 and to absorb road imperfections, may include a conventional coil spring and damper combination, a leaf-spring and damper combination, an active suspension unit, or any other suitable biasing device"; Fig. 4); and a shaft 10,19 (¶¶8,10,11; Figs. 1,4) to transfer torque from the power distribution device to the wheel, the shaft including a first member 11 (¶¶8,11; Figs. 1-3) having internal splines 12 (¶¶8,11; Figs. 1-3) and a second member 13 (¶¶8,11; Fig. 1) having external splines 14 (¶¶8,11; Fig. 1) engagable with the internal splines to allow telescopic movement between the first member and the second member (¶¶8,13) and to transfer torque between the first member and the second member (¶¶8,9).

Claim 12 further recites that the external splines include an isotropic surface finish, and the external splines have a coating applied to the isotropic surface finish to reduce friction during telescopic movement (¶¶8,13). More specifically, the latter two limitations are clearly taught by Appellants in specification paragraph 13, at page 4, line 21, through page 5, line 3:

Further, in the preferred embodiment, the external splines 14 also have an isotropic surface finish, as described in US 5,503,481 entitled "Bearing Surfaces with Isotropic Finish", issued on 02 April 1996, and incorporated in its entirety by this reference. The tungsten disulfide coating over an isotropic surface finish significantly reduces the friction between the first member and the second member, while increasing the wear and durability of the shaft.

(Emphasis added.) As taught in the '481 patent (the disclosure of which is expressly incorporated by reference, as recited above), an "isotropic surface finish" is a surface

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finish characterized by "extremely shallow irregularities that are nondirectional" and "very low average asperity slopes and likewise a very low plasticity indexes" ('481 patent Abstract, at lines 3-6); see, also, '481 patent, col. 2, lines 28-38 (isotropic surface finish is achieved by virtue of a further finishing step, after the surface is initially machined by grinding to achieve the desired profiles).

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VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 3 and 6 stand finally rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,903,965 ("Fletcher") in view of U.S. Patent No. 5,503,481 ("Hashimoto").

Claims 4 and 5 stand finally rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,903,965 ("Fletcher") in view of U.S. Patent No. 5,503,481 ("Hashimoto") in further view of Japanese Publication JP4013305196A ("JP '196").

Claims 9-15 stand finally rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 2,163,981 ("Lawrence") and U.S. Patent No. 5,720,102 ("McClanahan") in further view of U.S. Patent No. 5,503,481 ("Hashimoto").²

² While page 3 of the Detailed Action attached to the final action, at numbered paragraph 4, purports to give a detailed explanation of the obviousness rejection of "claims 12-15," the subsequent discussion also expressly characterizes claims 10 and 11 as obvious design choices in view of the Lawrence/McClanahan/Hashimoto combination, and also suggests that the absence of an express statement setting forth the basis for rejecting claim 9 – which depends directly from claim 12 – was an oversight by the Examiner. Thus, for purposes of this Brief, and in order to further prosecution of this appeal, Appellants arguments presented in Section VII below reflect Appellants understanding that the obviousness rejection set forth in numbered paragraph 4 of the Detailed Action applies to each of claims 9-15.

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VII. ARGUMENT

In the following remarks, the applied references are referenced as follows:

<u>Applied Reference</u>	<u>Reference Name</u>
US 2,163,981	"Lawrence"
US 5,503,481	"Hashimoto"
US 5,720,102	"McClanahan"
US 5,903,965	"Fletcher"
JP4013305196A	"JP '196"

Further, all references to the "Detailed Action" are to the Detailed Action attached to the final rejection mailed March 23, 2004, from which this appeal is taken.

CLAIMS 3 AND 6

Independent claim 6, as well as directly dependent claim 3, stand finally rejected under 35 U.S.C. §103(a) as being unpatentable over Fletcher in view of Hashimoto.

As noted in Section V of this paper, claim 6 recites a telescoping torque-transmitting shaft in which the external splines of one of the telescoped members include an isotropic surface finish, and wherein the external splines have a coating applied to the isotropic surface finish to reduce friction during telescopic movement. In view of Appellants' specification and its express incorporation by reference of Hashimoto's definition, an "isotropic surface finish" as recited by claim 6 is a surface finish characterized by "extremely shallow irregularities that are nondirectional" and "very low average asperity slopes and likewise a very low plasticity indexes," for example, achieved by a secondary finishing operation after an initial machining step. Claim 3 adds the further limitation that the applied friction-reducing coating is nylon.

Fletcher, on the other hand, expressly teaches a telescoping torque-transmitting shaft in which a coating of low friction material, such as a nylon, is applied to the "cleaned and primed" external splines of a torque transfer member, whereupon the coating is "shaped" in a subsequent operation, using an annular die, "to precisely conform to the internal splines" of the other member (col. 5, ll. 60-65).

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Because Fletcher relies upon the "somewhat fluid," subsequently "shaped" coating, rather than a precisely-machined (underlying) external spline, to achieve "precise conformance with the splines 22a of the slip yoke 22" (col. 6, ll. 59-61), Fletcher fails to provide any motivation or suggestion to incorporate the special and costly "isotropic surface finish" of Hashimoto on its externally-splined torque transfer member. Indeed, Fletcher is a divergent teaching; and the Examiner's asserted combination of Fletcher and Hashimoto begs the question of why one of ordinary skill would be motivated to generate a costly isotropic surface finish on a torque transfer member, only to thereafter apply and subsequently "shape" an "somewhat fluid" coating using an annular die (thereby substantively rendering moot the contributions of the isotropic surface finish to the resulting telescoping fit).

Appellants further note that Hashimoto teaches a roller bearing whose uncoated roller and bearing race "working surfaces" are provided with an isotropic surface finish and, hence, Appellants respectfully submit that the nature of Fletcher's divergence, coupled with the different problem-solution taught by Hashimoto, strongly suggests that the Examiner has failed, in the first instance, to make a prima facie case of obviousness with respect to claim 6, as well as its dependent claim 3.

In view of the foregoing, the reversal of the final rejections of claims 3 and 6 as unpatentable over the combination of Fletcher and Hashimoto is respectfully requested.

CLAIMS 4 AND 5

Claim 4 (which depends from claim 6) and claim 5 (which depends from claim 4) stand finally rejected under 35 U.S.C. §103(a) as being unpatentable over Fletcher and Hashimoto in further view of JP '196.

Claim 4 adds to claim 6 the limitation that the coating is tungsten disulfide, while claim 5 adds the further limitation that the tungsten disulfide coating "measures less than approximately 10 microns thick."

As noted above, Fletcher expressly teaches applying a coating of low friction material, such as a nylon, to "cleaned and primed" external splines of a torque transfer member, and then "shaping" the coating in a subsequent operation, as with

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an annular die, "to precisely conform to the internal splines" of the other member (col. 5, ll. 60-65); and Hashimoto teaches use of an uncoated isotropic surface finish on a roller bearing's "working surfaces."

According to the Japanese Patent Abstract of JP '196 published December 8, 1989 (as attached to the copy of JP '196 printed on the EAST system on August 4, 2003, and provided to Appellants with the nonfinal action mailed August 13, 2003), JP '196 teaches a dry-type vacuum pump in which the opposed surfaces of a rotor (93) and a pair of bearing races (91,92) are coated with tungsten disulfide "by the use of sputtering method or the like, thus forming thin tungsten disulfide layer" that is essentially self-lubricating. "Sputtering" is a vacuum evaporation/deposition process which physically removes portions of a "target" coating material and deposits a thin, firmly-bonded film onto an adjacent substrate/work.

As noted above in connection with the discussion of the patentability of claim 6, the asserted combination of Fletcher and Hashimoto neither teaches nor suggests a telescoping shaft wherein the external splines of one torque-transmitting members have an isotropic surface finish beneath a friction-reducing coating. Further, even if Fletcher is improperly modified through hind-sight reconstruction to envision an isotropic surface finish beneath its applied coating, if JP '196's thin, sputtered layer of tungsten disulfide were substituted for Fletcher's nylon coating, Fletcher would have to be further modified to eliminate its "shaping" step (as taught at col. 5, ll. 55-60) – and Fletcher's stated objective of providing a post-application "shaped" conformal coating specifically frustrated – because the tungsten disulfide layer is neither "somewhat fluid" once deposited on the external splines (as required by Fletcher, e.g., at col. 6, ll. 59-61) nor particularly amenable to subsequent "shaping" (as taught by Fletcher, e.g., at col. 5, ll. 55-60). Such a wholesale reconstruction of Fletcher is clearly improper and, hence, Appellants respectfully submit that the subject matter recited in claim 4, as well as its dependent claim 5, is patentable over the asserted combination of Fletcher, Hashimoto, and JP '196.

In view of the foregoing, the reversal of the final rejections of claims 4 and 5 as unpatentable over the combination of Fletcher, Hashimoto, and JP '196 is respectfully requested.

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CLAIMS 9 AND 12-15

Claims 9 and 12-15 stand finally rejected under 35 U.S.C. §103(a) as being unpatentable over Lawrence and McClanahan, in further view of Hashimoto.

As noted in Section V of this paper, independent claim 12 expressly recites a suspension system for a vehicle having a wheel and a power distribution device, wherein the suspension system includes, inter alia, telescoping torque transfer members wherein the external splines of one torque transfer member have an isotropic surface finish beneath the coating. Dependent claim 9 adds the limitation that the applied coating is nylon. Dependent claims 13, 14, and 15 add the limitation that one of the members is adapted to couple with the power distribution device, a first universal joint coupling the shaft and the power distribution device, and a second universal joint coupling the shaft and the wheel.

As to the basis for finally rejecting claims 9 and 12-15, in the Detailed Action, the Examiner notes that Lawrence teaches a vehicle suspension system including a telescoping shaft, but that Lawrence "does not directly disclose a suspension of vehicle wherein the external splines includes an isotropic surface finish, and a coating applied to the isotropic surface finish to reduce friction during the telescopic movement; wherein the coating is nylon, or tungsten disulfide." For these features, the Examiner looks to McClanahan, which the Examiner characterizes as teaching an isotropic surface finish by virtue of the fact that, "after finishing coating the external spline 24 by nylon material, the surface finish of the external spline become smooth to reduce friction, therefore, smooth surface finish is considered to correspond with isotropic surface finish" (Detailed Action, p. 5, ll. 2-5). The Examiner further characterizes Hashimoto as "teach[ing] the invention wherein the surface is isotropic surface finish" (Detailed Action, p. 5, ll. 6-7). Finally, the Examiner states that:

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify McClanahan's [sic] invention by having the surface of external splines formed of isotropic finish as taught by Hashimoto et al then applying a coating on top of isotropic finish in order to

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sufficiently facilitate telescopic movement between the internal and external splines.

(Detailed Action, p. 5, ll. 8-12).

Appellants concur with the Examiner that Lawrence "does not directly disclose a suspension of vehicle wherein the external splines includes an isotropic surface finish, and a coating applied to the isotropic surface finish to reduce friction during the telescopic movement; wherein the coating is nylon, or tungsten disulfide" (Detailed Action, p. 4, ll. 12). However, contrary to the Examiner's reading of McClanahan and Hashimoto, Appellants respectfully submit that these secondary references fail to cure these basic deficiencies of Lawrence and, indeed, teach away from the asserted combination.

Specifically, McClanahan teaches applying a low-friction Nylon coating to the external splines of a telescoping driveline slip joint assembly, "where there are selected areas of increased thickness of the low friction coating which are integrally formed from the low friction coating and which provide means for enhancing the dynamic balancing of the drive line slip joint assembly" (col. 2, lines 63-67; emphasis added). Further, McClanahan teaches preparing the surface before applying the coating by "grit blasting and sanding" (col. 4, lines 65-67), resulting in a surface finish substantially different from Appellants' claimed "isotropic surface finish." Simply stated, like Fletcher, McClanahan teaches use of a relatively "unfinished" substrate with a rather dimensionally-"forgiving" coating and, hence, McClanahan provides absolutely no motivation for generating a costly isotropic surface finish on a torque transfer member, only to thereafter apply this coating with "selected areas of increased thickness." And, as noted above, because Hashimoto is directed to a different problem-solution of uncoated roller bearing working surfaces, Hashimoto similarly provides absolutely no motivation or suggestion to for one of ordinary skill to use Hashimoto's isotropic surface finish in place of McClanahan's grit blasted and sanded pre-coating surface.

In view of the foregoing, the reversal of the final rejections of claims 9 and 12-15 as unpatentable over the combination of Lawrence, McClanahan, and Hashimoto is respectfully requested.

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CLAIMS 10 AND 11

Claims 10 and 11 stand finally rejected under 35 U.S.C. §103(a) as being unpatentable as an obvious design choice in view of the asserted combination of Lawrence, McClanahan, and Hashimoto. As noted in Section V of this paper, base claim 12 expressly recites a suspension system for a vehicle having a wheel and a power distribution device, wherein the suspension system includes, inter alia, telescoping torque transfer members wherein the external splines of one torque transfer member have an isotropic surface finish beneath the coating. Dependent claim 10 adds to base claim 12 the limitation that the coating is tungsten disulfide, while dependent claim 11 adds to claim 10 the further limitation that the tungsten disulfide coating "measures less than approximately 10 microns thick."

As to the basis for the final rejections of claims 10 and 11, the Examiner states that:

it would have been obvious design choice for one having ordinary skill in the art at the time the invention was made to apply a very thin layer of tungsten disulfide on the external spline of McClanahan instead of Nylon in order to reduce friction such that telescopic movement between the first and second shafts, since it have been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a mater of obvious design choice.

(Detailed Action, p. 5, l. 20 to p. 6, l. 4).

As noted above with respect to the limitations of base claim 12, Appellants concur with the Examiner that Lawrence "does not directly disclose a suspension of vehicle wherein the external splines includes an isotropic surface finish, and a coating applied to the isotropic surface finish to reduce friction during the telescopic movement; wherein the coating is nylon, or tungsten disulfide" (Detailed Action, p. 4, ll. 12). And, as explained above with respect to the patentability of base claim 12 over the combination of Lawrence, McClanahan, and Hashimoto, Appellants

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respectfully submit that these secondary references fail to cure these basic deficiencies of Lawrence and, indeed, teach away from the asserted combination.

Specifically, McClanahan teaches applying a low-friction Nylon coating to the external splines of a telescoping driveline slip joint assembly, "where there are selected areas of increased thickness of the low friction coating which are integrally formed from the low friction coating and which provide means for enhancing the dynamic balancing of the drive line slip joint assembly" (col. 2, lines 63-67; emphasis added). Further, McClanahan teaches preparing the surface before applying the coating by "grit blasting and sanding" (col. 4, lines 65-67), resulting in a surface finish substantially different from Appellants' claimed "isotropic surface finish." Simply stated, like Fletcher, McClanahan divergently teaches use of a relatively "unfinished" substrate with a rather dimensionally-"forgiving" coating and, hence, McClanahan provides absolutely no motivation for generating a costly isotropic surface finish on a torque transfer member, only to thereafter apply this coating with "selected areas of increased thickness." And, as noted above, because Hashimoto is directed to a different problem-solution of uncoated roller bearing working surfaces, Hashimoto similarly provides absolutely no motivation or suggestion to for one of ordinary skill to use Hashimoto's isotropic surface finish in place of McClanahan's grit blasted and sanded pre-coating surface.

Regarding the specific limitation added by dependent claim 10 that the coating be tungsten disulfide and the Examiner's assertion that "a very thin layer of tungsten disulfide" could be applied to the McClanahan's external splines in place of its disclosed Nylon coating, such a modification would defeat McClanahan's stated objective of achieving a coating with "selected areas of increased thickness ... which provide means for enhancing the dynamic balancing of the drive line slip joint assembly." As such, such a substitution of tungsten disulfide for the disclosed nylon coating constitutes improper hindsight reconstruction of McClanahan. And dependent claim 11 adds the further limitation that the tungsten disulfide coating "measures less than approximately 10 microns thick" which, once again, is a particularly "thin" coating that fails to meet McClanahan's stated objectives of "selected areas of increased thickness" and dynamic shaft balancing.

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In view of the foregoing, the reversal of the final rejections of claims 10 and 11 as being an unpatentable obvious design choice of the combination of Lawrence, McClanahan, and Hashimoto is respectfully requested.

CONCLUSION

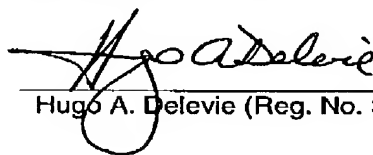
From the foregoing, Appellants respectfully submit that the final rejections of claims 3-6 and 9-15 be reversed.

Respectfully submitted,

09/28/2004

Date

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VIII. APPENDIX - CLAIMS ON APPEAL

1. (Cancelled)
2. (Cancelled)
3. (Previously amended): The shaft of claim 6, wherein said coating is nylon.
4. (Previously amended): The shaft of claim 6, wherein said coating is tungsten disulfide.
5. (Previously amended): The shaft of claim 4, wherein said coating measures less than approximately 10 microns thick.
6. (Previously amended): A shaft to transfer torque in a vehicle, comprising:
 - a first member having internal splines; and
 - a second member having external splines engagable with said internal splines to allow telescopic movement between said first member and said second member and to transfer torque between said first member and said second member, wherein said external splines further include an isotropic surface finish, and wherein said external splines have a coating applied to the isotropic surface finish to reduce friction during the telescopic movement.
7. (Cancelled)
8. (Cancelled)
9. (Previously amended): The suspension system of claim 12, wherein said coating is nylon.
10. (Previously amended): The suspension system of claim 12, wherein said coating is tungsten disulfide.

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11. (Previously amended): The suspension system of claim 10, wherein said coating measures less than approximately 10 microns thick.

12. (Previously amended): A suspension system for a vehicle having a wheel and a power distribution device, the suspension system comprising:

a biasing device to support the vehicle on the wheel and to absorb road imperfections; and

a shaft to transfer torque from the power distribution device to said wheel, the shaft including a first member having internal splines and a second member having external splines engagable with said internal splines to allow telescopic movement between said first member and said second member and to transfer torque between said first member and said second member,

wherein said external splines further include an isotropic surface finish, and

wherein said external splines have a coating applied to the isotropic surface finish to reduce friction during the telescopic movement.

13. (Previously amended): The suspension system of claim 12, wherein one of said first and second members is adapted to couple with the power distribution device and one of said first and second members is adapted to couple with the wheel.

14. (Previously amended): The suspension system of claim 12, further comprising a first universal joint coupling said shaft and the power distribution device.

15. (Previously amended): The suspension system of claim 14, further comprising a second universal joint coupling said shaft and the wheel.

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